

Claims

1. A semitransparent optical detector comprising:
a semitransparent PIN diode having at least one polycrystalline semiconductor layer.
2. The detector of claim 1, wherein the polycrystalline semiconductor is polycrystalline silicon.
3. The detector of claim 2, wherein the polycrystalline silicon is microcrystalline.
4. The detector of claim 1, wherein the polycrystalline semiconductor is a polycrystalline alloy of silicon and germanium.
5. The detector of claim 4, wherein the polycrystalline alloy is microcrystalline.
6. The detector of claim 1, wherein the PIN diode has another layer of at least one of an amorphous semiconductor and a microcrystalline semiconductor.
7. The detector of claim 1, further comprising:
a transparent substrate upon which the PIN diode is disposed.
8. The detector of claim 7, further comprising:
a transparent conductor disposed on a surface of the PIN diode.
9. A method of making a semitransparent optical detector comprising:
fabricating an amorphous semiconductor PIN diode on a transparent conductor; and
recrystallizing the amorphous semiconductor.
10. The method of claim 9, recrystallizing further comprising:
placing the amorphous semiconductor in a processing furnace.

11. The method of claim 10, further comprising:
during recrystallizing, flowing a forming gas of H₂ and N₂ through the processing
furnace.
- 5 12. The method of claim 11, further comprising:
raising a temperature in the processing furnace to at least about 800°C.
13. The method of claim 9, fabricating further comprising:
10 depositing amorphous silicon as the amorphous semiconductor.
14. The method of claim 9, recrystallizing further comprising:
depositing the transparent conductor on a transparent substrate; and
rapidly annealing the amorphous semiconductor with high intensity heat applied to a
15 side thereof away from the transparent substrate.
15. The method of claim 14, further comprising:
exposing the amorphous semiconductor to an argon plasma before rapidly annealing.
- 20 16. The method of claim 9, recrystallizing further comprising:
exposing a region of the amorphous semiconductor to a laser pulse having sufficient
energy to locally raise a temperature of the amorphous semiconductor above about
800°C.
- 25 17. A method of making a semitransparent optical detector comprising:
depositing a transparent conductor onto a transparent substrate; and
growing a polycrystalline PIN diode on the transparent conductor using high-
temperature thermal chemical vapor deposition.
- 30 18. The method of claim 17, growing the polycrystalline PIN diode further comprising:

raising a temperature at which growing is performed above about 800°C.

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